Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION VII
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Technical Sciences of SASA
Institute for Testing of Materials
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 17-19. September 2018.

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extensively due to their interesting optical, electrical and mechanical properties. Their excellent physical and chemical properties in various fields, such as catalysis, sensors, solar cells, photo detectors, light emitting diodes and laser communication, have made them very attractive and promising materials. Semiconductor particles immobilized in a polymer matrix with nano-scale grain size show different properties relative to the same material in bulk form because of quantum size effects. Many different synthetic approaches, like thermal evaporation, chemical bath deposition, chemical vapor deposition (CVD), laser ablation, hydrothermal, homogeneous precipitation in an organic matrix, sonochemical and sol–gel methods, have been employed for the synthesis of metal sulfide nanoparticles. In this work we investigate the structural and optical properties of polymer nanocomposites prepared by the incorporation of ZnS nanoparticles into the matrices of polymer poly (methyl methacrylate) (PMMA). The structural studies of the metal sulfides/polymer nanocomposites were carried out by Scanning electron microscopy (SEM), Raman spectroscopy and Far-infrared spectroscopy. The dielectric function of ZnS nanoparticles is modeled as a mixture of homogenous spherical inclusion in air, by the Maxwell-Garnet formula. In the analysis of the far-infrared reflection spectra, appearance of combined plasmon-LO phonon modes with high phonon damping are observed, which causes decreases of coupled plasmon-phonon frequencies.

P18

Synthesis and characterization of Al pillared montmorillonite impregnated with cobalt

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Aluminum pillared clay (AP) was synthesized using ≤ 74 μm fraction of Na-exchanged clay from Wyoming, USA (Na-Wy). The process of pillaring was carried out according to a common procedure comprising the following steps: pillaring, rinsing, drying and calcination. The obtained pillared clay was impregnated with Co^{2+} using incipient wetness impregnation method. The obtained sample was calcined and denoted as CoAP. Powder X-ray diffraction (XRD) patterns of Na-Wy, AP and CoAP indicated the presence of montmorillonite, quartz and feldspar. The pillaring affected montmorillonite peak corresponding to the 001 reflection. The d_{001} value increased from 1.17 nm for Na-Wy to 1.82 nm for AP. The pillaring process also fixed the basal spacing and no swelling was registered. In the diffractogram of CoAP the 001 peak was not well defined and was shifted to higher 2θ values. Nitrogen adsorption–desorption isotherms were used to determine textural properties of the samples. Pillaring resulted in enhanced textural properties such as increased total pore volume and specific surface area in the mesoporous region, as well as increased micropore volume comparing with that of Na-Wy. On the other hand, for CoAP textural parameters' values were lower than those of AP, which could be ascribed to successful cobalt impregnation.

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